



Utilizing Online Databases To Share And Understand Volunteer Water Monitoring Data

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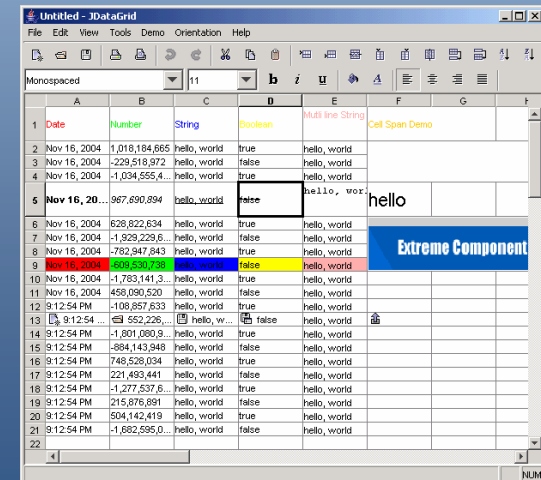
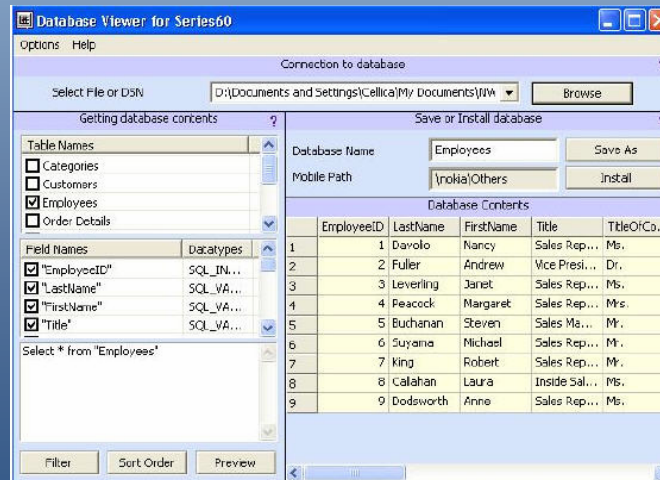
Data Management

- 💧 Essential for program organization
- 💧 Essential to effectively share results



Data Management Options

- 👉 Paper files
- 👉 Spreadsheets
- 👉 Desktop databases
- 👉 Online databases



Database

- 💧 **Data stored in tables made up of rows and columns**

Spreadsheet

- 💧 **Data organized by fields, records and files**
 - ✓ **Field – a single piece of information**
 - ✓ **Record – a complete set of fields**
 - ✓ **File – a collection of records**
 - ✓ **e.g., telephone book**

Databases

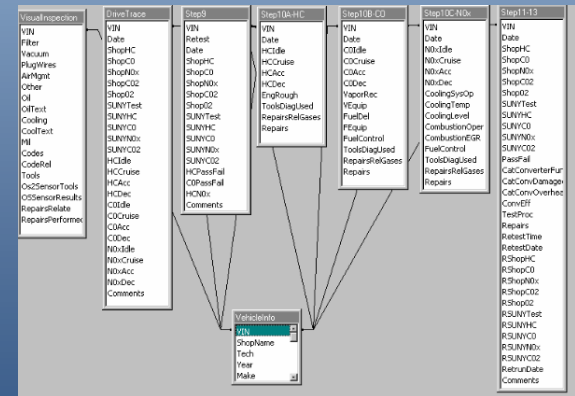
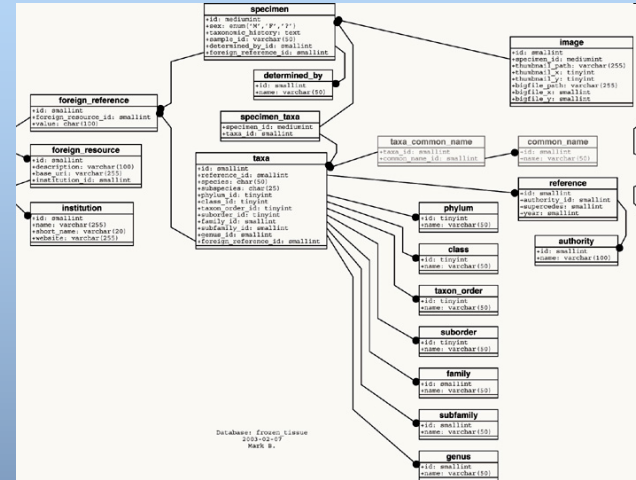
Most common is relational database

Multiple tables related by specific information

Example:

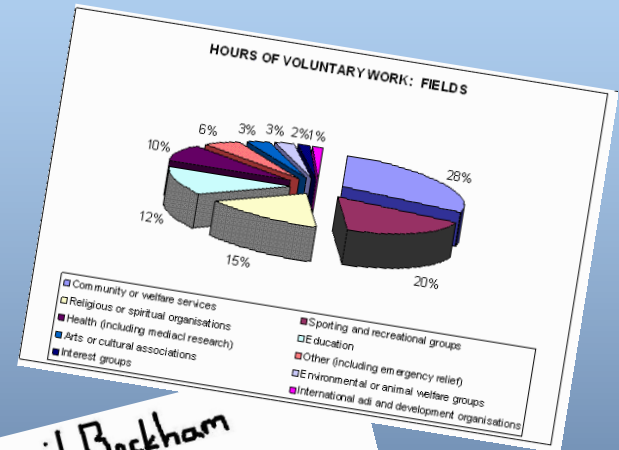
✓ Water transparency data for a site in one table

✓ Latitude and longitude information for site in another table




Think about information you work with that could be stored in a spreadsheet or database...

- 💧 A list of people and their contact info?
- 💧 Monitoring data?
- 💧 Volunteer hours reporting?
- 💧 ...



- 1) David Beckham
- 2) Britney Spears
- ~~3) The Queen~~
- 3) Barry Manilow
- 4) Jonny Wilkinson
- 5) Gordon Brown
- 6) Buffy the Vampire Slayer
-

Pros and Cons of Options

Paper files	Spreadsheet	Desktop database	Online database
Easier to use			More difficult to use (need programmer and to train users)
↓ Generally less expensive			Can be free, but tend to be pricier
% chance of transcription error	Simple e-file backup		
Can ✓ data sheets	Programmable to meet individual needs		
Maintenance, security & backup depend on data quantity	Data integrity can be compromised (e.g., sorting errors)		

Pros and Cons of Options

Paper files	Spreadsheet	Desktop database	Online database
	Only 1 user at a time can modify data	Limited ability to modify data at one time by multiple users	Multiple users can modify data at one time
	Data must be entered from a single computer		Multiple computers at various locations
Analyses and data sharing can be challenging	Good at stats & graphing-friendly	Good for searching and retrieving data	
		Data on web usually static	Web posting of data is dynamic (auto-updated when user adds data)
Large storage area possibly required	Good for small data sets	Can store large volumes of data in minimal amount of space	

Questions to Help You Decide

- 💧 Do the data need to be stored long-term?
- 💧 Do multiple people need access to the data?
- 💧 Should data be safeguarded against erroneous entries?
- 💧 Should the data be protected against inadvertent corruption?
- 💧 Is a large part of the information redundant?



If yes to any of those questions...

💧 Consider developing a database

💧 Resources:

- ✓ Data to Information (University of Maine publication)
- ✓ *The Volunteer Monitor* newsletter (available online)
- ✓ About.com



"The most important thing you need to know before you start developing a database is what you want out of it."

- Karen Diamond (Great Bay Watch, NH)

Questions to Consider...Resources

💧 What resources do you have available?

✓ Human

- Number of staff
- Technical abilities

✓ Computer-related

- Programs available
- Server
- Back up?

✓ Financial

- Start up costs
- Maintenance costs



Wisconsin's Database

- Statewide Volunteer Stream Monitoring Program



- Oracle-based



- Initiated planning just before turn of the century



- Online availability 2002

- Revised 2006-8

Questions to Consider...Resources

💧 Wisconsin's Database

✓ Human

- One programmer
- One program coordinator

✓ Computer-related

- Oracle maintained through UW
- Coldfusion supported by UW
- Back up automated thru UW

✓ Financial

- Development & maintenance linked with UW-Extension IT
- Training budget through vol. mon. program

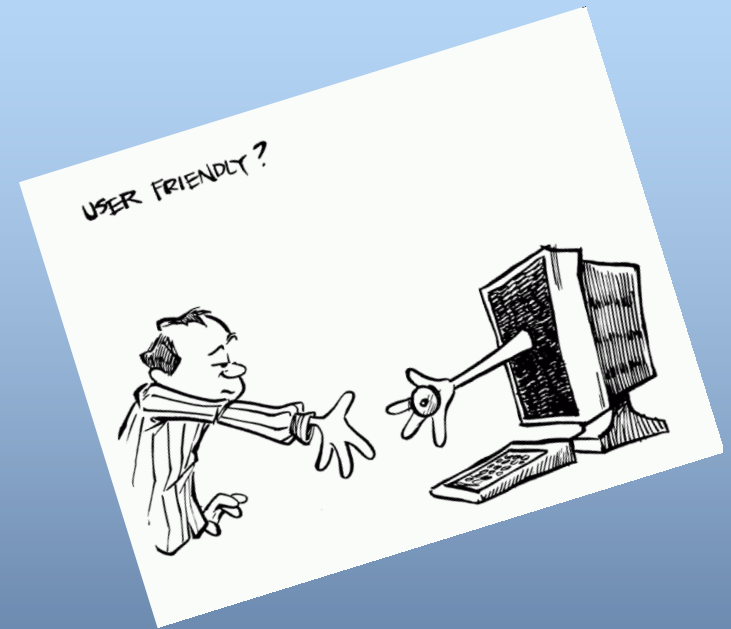


Double your anticipated
timeline.

Double your budget too.

Questions to consider...Who?

- Who will use the data?
 - ✓ Allows it to be user-friendly for entry and searching
 - ✓ Internal “workings” can be set up most logically



Questions to consider...Who?

💧 Wisconsin's Database

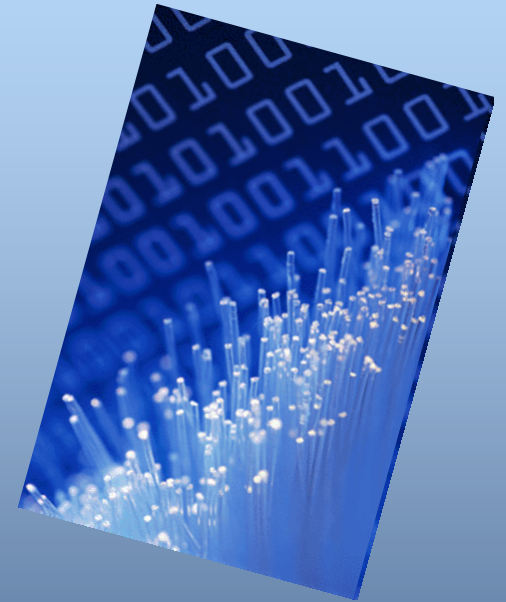
- ✓ Volunteer monitors
- ✓ Biologists/county staff
- ✓ Program coordinator
- ✓ General public



Make sure the volunteers,
program coordinators and
data users are all involved in
the creation of the data
system, from start to finish.

Questions to consider...Output?

- 💧 How will the data be used and what type of output is best?
 - ✓ Allows output to be most meaningful to users

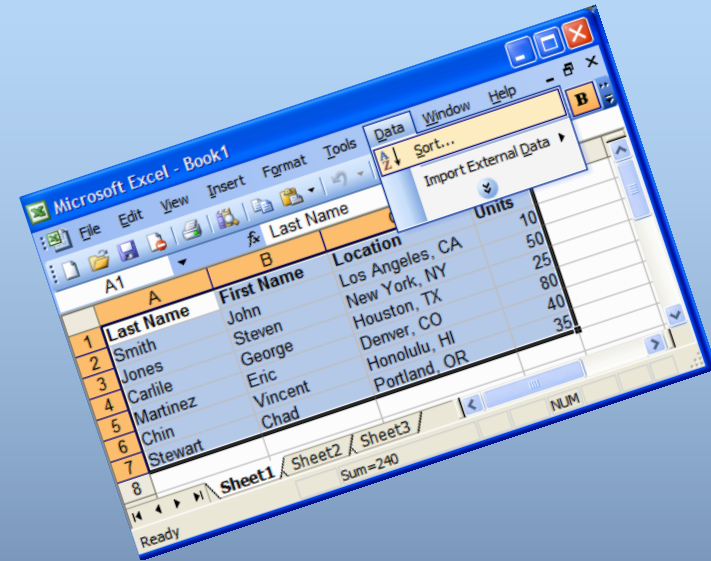


Questions to consider...Output?

💧 Wisconsin's Database

✓ Initial output challenging to use

- Html & Excel views the same
- Limited ability to sort data for analyses



The screenshot shows a Microsoft Excel window titled 'Microsoft Excel - Book1'. The spreadsheet contains a table with the following data:

	Last Name	First Name	Location	Units
1	John	John	Los Angeles, CA	10
2	Smith	Steven	New York, NY	50
3	Jones	George	Houston, TX	25
4	Carlile	Eric	Denver, CO	80
5	Martinez	Vincent	Honolulu, HI	40
6	Chin	Chad	Portland, OR	35
7	Stewart			
8				

The status bar at the bottom shows 'Ready' and 'Sum=240'.

Be extremely clear when you talk to the developers (programmers) about expectations.

Questions to consider...Storage?

- 💧 **Will you store raw data and/or calculated results?**
 - ✓ Errors can be minimized through auto-calculations



Questions to consider...Storage?

💧 Wisconsin's Database

✓ We store raw data and calculated results

- Biotic index is calculated from macroinvertebrates present
- Habitat score is tallied automatically
- Dissolved oxygen % saturation is calculated



Questions to consider...Reports?

- 💧 **What reports do you want from the database? You may want...**
 - ✓ **List of volunteers**
 - ✓ **List of sites**
 - ✓ **Raw data about a parameter**
 - ✓ **To compare between sites**
 - ✓ **To compare results at a site over time**
 - ✓ **To compare results to a state standard**

Questions to consider...Results Format?

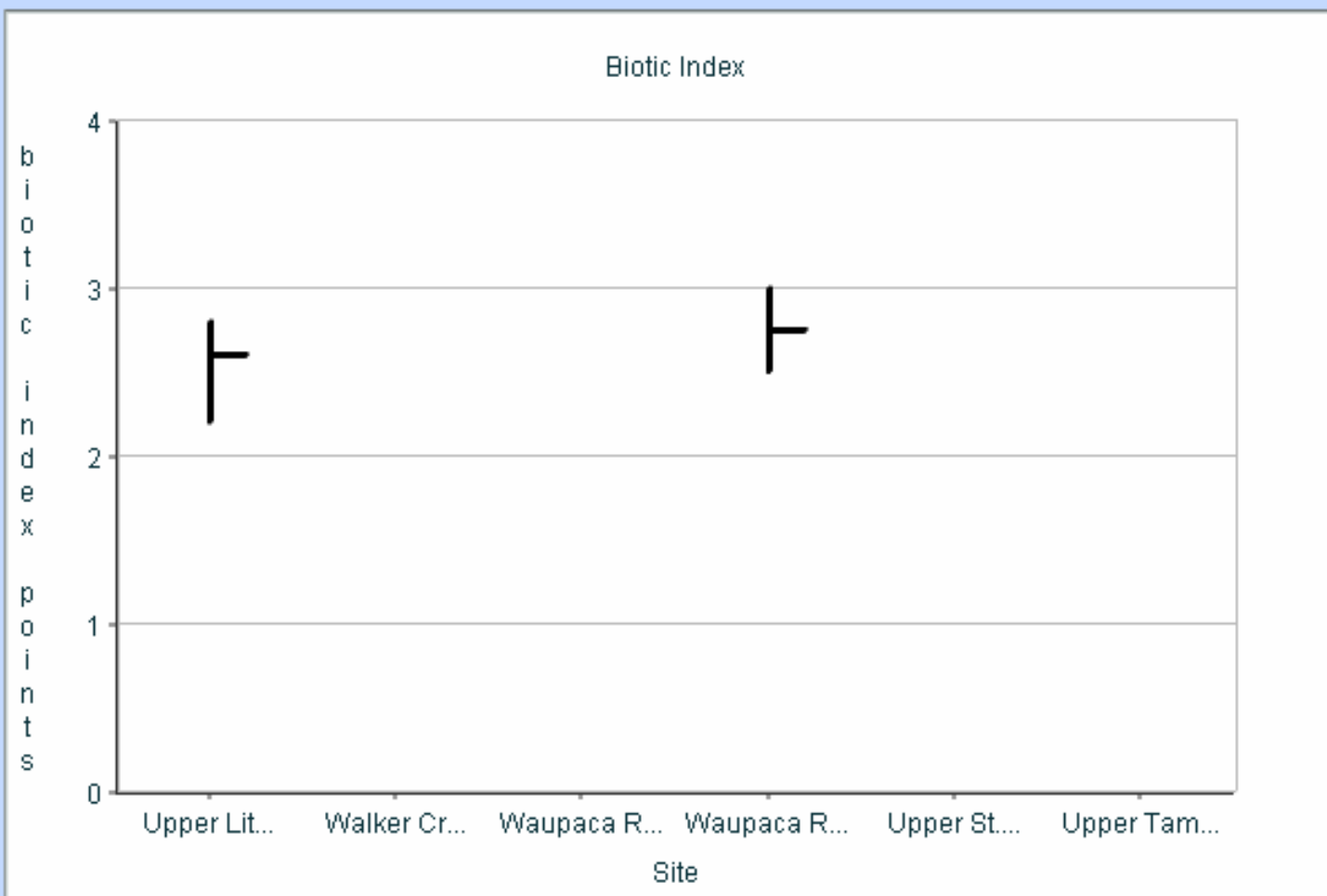
- 💧 How do you want the data to be presented?
 - ✓ Graphically?
 - ✓ Tabular format?

Questions to consider...Reports and Results Format?

Wisconsin's Database

- ✓ Can obtain tabular data about parameters
- ✓ Can compare between sites
- ✓ Can compare a site over time
- ✓ Cannot view volunteers' names
- ✓ Administrator can view participant contact info.

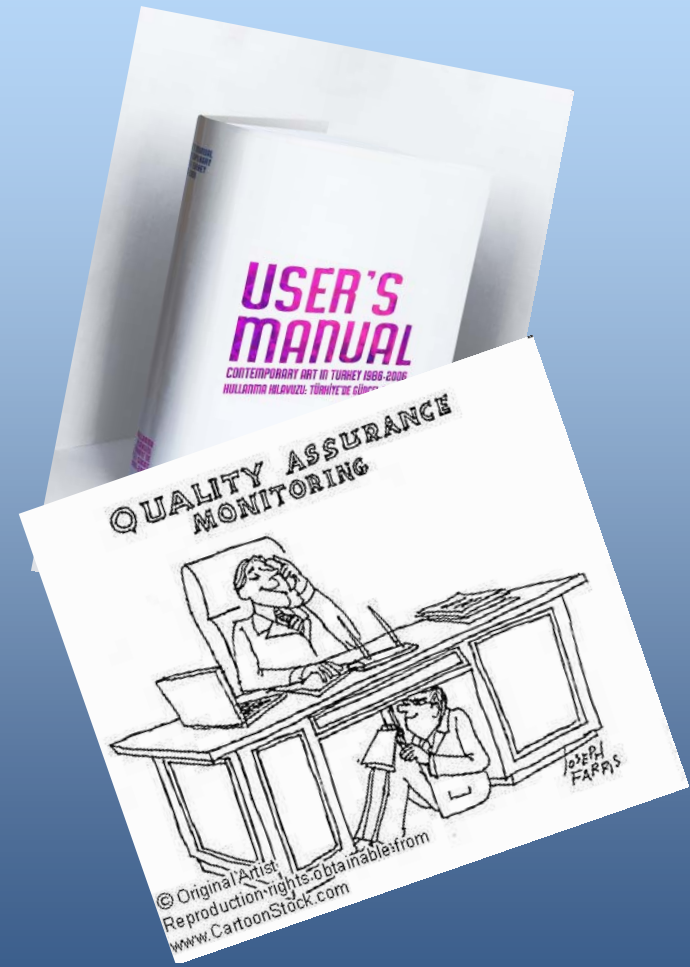
Biotic Index



Site	Low	Median	High
Upper Little Wolf River, Reeve Reserve at McNinch Road (n=3)	2.2	2.6	2.8
Walker Creek (N. Branch Beaver Creek feeder stream) at 33rd Road (n=0)			
Waupaca River at Hwy 22 and the Riverside Park, due west of parking lot (n=0)			
Waupaca River at Hwy 22 and the Riverside Park, due west of parking lot (n=2)	2.5	2.8	3.0

Questions to consider...Data Integrity?

- 💧 How will you prevent data entry errors?
 - ✓ Set ranges for parameters
 - ✓ Automated calculations
 - ✓ Training for users
 - ✓ Users' Manual
 - ✓ Quality checking the data



Hire a data person.

Questions to consider...Data Integrity?

💧 Wisconsin's database

- ✓ Max. 25 C temp., max 18 mg/L D.O., etc.
- ✓ BI/Habitat calculated
- ✓ Webinar training
- ✓ Users' Manual online
- ✓ Coordinators must approve data before they are stored in database (automated email reminders)



Questions to consider...Security?

- 💧 **How will you ensure the security of the data in the database?**
 - ✓ Login and password required
 - ✓ Site registration process not fully automated
 - ✓ Administrative privileges for select few



Where possible, share.

It is worth exploring using data systems that already exist to store and manage your data.

Survey About Online Databases

Surveyed 19 programs

- ✓ Took an average of 2.5 years to develop & implement online databases (Range: 3 months – 12 years)
- ✓ State funds, federal funds, grants, donations, & in kind services used
- ✓ 11 of 19 have volunteers enter data; 9 have staff enter data when needed

Hone your sense of humor and diplomatic skills.

Developing a sophisticated system will be stressful for everyone involved.

How you handle it will make a big impact on your project.

Resources

- 💧 <http://www.usawaterquality.org/volunteer/Outreach/Databases.pdf>
- 💧 <http://www.usawaterquality.org/volunteer/DataReporting/index.html>

Thank you!